Chapter 2
Selecting the Right Stormwater BMP Technology

This chapter describes considerations for choosing a BMP system. A list of decision criteria and questions aimed at obtaining answers to help narrow down the BMP options, and select the most appropriate BMP system for site specific conditions is provided.

2.1. Decision Criteria

To achieve the greatest effectiveness of a BMP system, it is necessary to determine the type(s) of BMPs that are most suitable for the characteristics of a project site. The following is a list of questions and considerations that should be addressed in order to determine which BMP or combination of BMPs is/are most suitable for a specific site.

Site Considerations

What are the target pollutants for treatment?

The type of land use and activities within a drainage area determine the types of contaminants that may be present in stormwater. Land use types can be classified as: rural, residential, roads and highways, agriculture, commercial, industrial and ultra-urban sites. Different types of BMP technologies treat different contaminants. Because of this, it is important to know the types of contaminants present in stormwater runoff in order to choose the most appropriate BMP for treatment of site specific target contaminants.

What are the potential site limitations for installation and operation?

Protected, restricted or sensitive areas

Protected, restricted or sensitive areas are located adjacent to a waterbody, close to the groundwater table, a habitat for a threatened species, or for various other reasons. Sites in proximity to protected, restricted or sensitive areas require careful consideration, and may require special permits as well as additional time and equipment for proper erosion, sediment, and disturbance control. If you are unsure whether or not a proposed area is protected, restricted, or sensitive, contact the local town offices, the New Hampshire Natural Heritage Inventory (271-3623), or NH DES (271-3505).

Drainage area

The size of the drainage area, the amount and type of land use activity, the amount and frequency of rainfall and flow within the area, and the slope are important factors in BMP selection. Many BMPs are designed to treat a maximum flow of water (measured in cubic feet per second (cfs)). Knowing the average flow in cfs and the size of the drainage area will help determine the type(s), number, and configuration of BMPs needed for a specific site.

Proximity to the water table

The depth to the water table is a consideration in terms of ease and expense of installation, as well as precautionary measures that may be required to protect against groundwater contamination. Many BMPs,

especially those that use filtering as the primary treatment method, require installation at a specific depth above the water table in order to function properly and allow for drainage.

It is important to have proper equipment on-site for activities such as pumping excess water from the excavation area and defining an appropriate receiving area for that excess water.

Depth to bedrock

The depth to bedrock or other impermeable layer is a consideration in terms of ease and expense of BMP installation. Bedrock is the solid layer of parent material below the soil. Installation of a subsurface, or below-ground BMP at a depth below the bedrock surface, increases labor and equipment needed for excavation, because blasting and other special equipment is often necessary.

Installation Considerations

What is the land area available for installation?

Because most innovative stormwater BMPs are installed in areas with limited space, it is important to know the amount of land available for excavation and installation. Typically, BMP size increases as the drainage area and amount of water treated increases. The installation site should be sized accordingly.

How much time, labor, and equipment are required for installation, and what is the associated cost?

Knowing the time, labor, and equipment required for installation are important factors for ensuring an efficient, safe, and organized installation, as well as an affordable one. The time required for installation should be a factor in determining installation cost, because a greater number of laborers and amount of time will result in a greater overall cost. Rental or purchase of special equipment necessary for installation such as cranes, backhoes, and pumps should also be a cost consideration.

Is pretreatment necessary?

Pretreatment is the process of treating stormwater runoff before it reaches the primary BMP. Pretreatment typically includes such practices as settling basins, infiltration trenches, constructed wetlands, treatment swales, and even other innovative BMPs, which are installed to reduce the amount of contaminants and/or to slow the flow of water prior to primary treatment. The majority of BMPs described in this manual do not require pretreatment and can be used as stand alone treatment devices. However, when pretreatment is necessary, it typically increases the overall project costs.

Maintenance Considerations

How often should the BMP be inspected?

It is important to know the schedule and routine of inspection necessary to ensure proper BMP functioning. Typically, the manufacturer is able to recommend an inspection schedule in order to establish an appropriate maintenance schedule. The manufacturer should also be able to provide the required inspection guidelines.

What are the short- and long-term maintenance costs and requirements? Can these requirements be met and who is responsible for ensuring they are met?

BMP inspection and maintenance must be considered in the selection process. If maintenance requirements are not met after installation, the BMP will not operate properly and will not produce effective treatment of stormwater runoff. Because of this, before selecting a BMP, it is important to know the equipment necessary for maintenance. Many BMPs require the use of a vacuum truck or other heavy machinery for removal of collected debris. If such equipment is not already available, its purchase is a considerable added cost that must be factored into the total project cost.

It is recommended that all BMP installation projects have structured maintenance plans prior to installation as part of the initial project proposal. For further details of installation, operation and maintenance planning, see Chapter 4.

Aesthetics and Community

Does the BMP blend into the landscape?

Careful planning, landscaping, and upkeep are important in maintaining visual aesthetics of a BMP. If the installation site is in an area of public gathering, a subsurface installation may be more appealing.

Does the community support the installation and understand the concept and function of the BMP?

Public availability of BMP educational materials and activities is often helpful for acceptance and understanding of a BMP's function. Activities to increase public understanding and awareness include press releases that describe the project and its need, educational signs and postings at the project site, or a BMP "open house" to invite the community to view the BMP and provide a discussion forum.

Are there safety concerns involved with a particular BMP?

For BMP installations in areas frequented by community members, particularly children, such as parks, schools, or other recreation areas, BMPs should be selected with safety concerns in mind. For areas where there is potential for the BMP to be disturbed or vandalized, consideration should be given to selecting a BMP that is less obvious and less likely damaged.

Cost

Is the BMP installation, operation, and maintenance affordable?

It is important to select the most effective BMP system for a specific site for the most reasonable cost, and to take long-term maintenance and replacement costs into consideration. A BMP is only effective if it is properly maintained. In addition to the benefits that can be quantified in dollars, it is also important to consider the benefit of improved water quality.

Verification Ranking

What types of studies have been performed to test the product efficiency?

The extent of product claim verification and product efficiency verification are determined by the studies that have been conducted on a particular BMP product. A product that has been repeatedly tested and successful in removing contaminants could be more confidently selected as a BMP option than one that has not. However, an individual product should not necessarily be excluded from selection if it has not undergone critical testing. Several products are new to the market and have not yet undergone, or are currently in the process of testing.

Chapter 5 includes information on the type of performance data available for each technology, including a list of the studies conducted on each product. NH DES has developed a ranking system to help the reader determine the extent of data currently available. This ranking system is based on who was responsible for conducting the study and the types of studies conducted, including laboratory or field studies, or an accepted literature review of product claims. This ranking system does not attempt to verify the method or the results of each study.

The five-point system is based on the assumption that manufacturer-conducted testing has a greater potential for bias than an accepted literature review (such as the Massachusetts Strategic Envirotechnology Partnership (STEP) Program) or a third party-conducted study, and is, therefore, a less desirable type of study for product verification. Laboratory studies tend to have more control over the results, but may not be representative of "real-life" conditions, whereas field studies tend to have "real-life" conditions, but are subject to unplanned events and other types of variability. For technologies that have had a combination of testing types, the BMP will be assigned the highest rank.

The ranking criteria is as follows:

0 - no study conducted or no current information available

♦ - manufacturer-conducted, laboratory study

♦♦ - manufacturer-conducted, field study

♦♦♦ - third party-conducted, laboratory study

♦♦♦♦ - third party-conducted, field study

♦♦♦♦♦ - accepted literature review of product claim

NH Installations

Have there been previous installations in New Hampshire or in the Northeast? If yes,

What are the results/successes of existing New Hampshire installations?

Knowledge of previously installed BMPs in NH provides first hand information regarding installation, success of operation, relative cost and areas of concern. Each technology description in Chapter 5 includes a New Hampshire installation contact section, which provides the contact information of a person responsible for a BMP. For those technologies not yet installed in New Hampshire, contact information is provided for the nearest installation, where available.